

I CLAIM:

1       1. A lost circulation additive comprising a dry mixture  
2       of a water soluble crosslinkable polymer, a crosslinking  
3       agent, and a reinforcing material selected from among  
4       fibers and comminuted plant materials.

1       2. The additive of claim 1 wherein the polymer is an a  
2       carboxylate-containing polymer and the crosslinking agent  
3       is a chromic carboxylate complex.

1       3. The additive of claim 2 wherein the reinforcing  
2       material comprises hydrophilic and hydrophobic fibers.

1       4. The additive of claim 3 wherein the hydrophobic  
2       fibers comprise at least one selected from the group of  
3       hydrophobic fibers consisting essentially of nylon,  
4       rayon, and hydrocarbon fibers, and wherein the  
5       hydrophilic fibers comprise at least one selected from  
the group of hydrophilic fibers consisting essentially of

7        glass, cellulose, carbon, silicon, graphite, calcined  
8        petroleum coke, and cotton fibers.

1        5. The additive of claim 2 wherein the reinforcing  
2        material comprises comminuted plant material.

1        6. The additive of claim 5 wherein the reinforcing  
2        material comprises at least one comminuted material  
3        selected from the group of comminuted plant materials  
4        consisting essentially of nut and seed shells or hulls of  
5        almond, brazil, cocoa bean, coconut, cotton, flax, grass,  
6        linseed, maize, millet, oat, peach, peanut, rice, rye,  
7        soybean, sunflower, walnut, and wheat; rice tips; rice  
8        straw; rice bran; crude pectate pulp; peat moss fibers;  
9        flax; cotton; cotton linters; wool; sugar cane; paper;  
10       bagasse; bamboo; corn stalks; sawdust; wood; bark; straw;  
11       cork; dehydrated vegetable matter; whole ground corn  
12       cobs; corn cob light density pith core; corn cob ground  
13       woody ring portion; corn cob chaff portion; cotton seed  
14       stems; flax stems; wheat stems; sunflower seed stems;

15 soybean stems; maize stems; rye grass stems; millet  
16 stems; and mixtures thereof.

1 7. The additive of claim 2 wherein the polymer is a  
2 partially hydrolyzed polyacrylamide.

1 8. The additive of claim 7 wherein the reinforcing  
2 material is a comminuted material selected from among  
3 comminuted materials derived from peanuts, wood, paper  
4 any portion of rice seed or plant, any portion of corn  
5 cobs, and mixtures thereof.

1 9. The additive of claim 8 wherein the additive further  
2 includes cellophane, and wherein the reinforcing material  
3 is a comminuted material selected from among mixtures of  
4 comminuted rice fraction and peanut hulls; mixtures of  
5 comminuted rice fraction, and wood fiber or almond hulls;  
6 mixtures of comminuted rice fraction and corn cob  
7 fraction; and mixtures of comminuted rice fraction and  
8 corn cob fraction and at least one of wood fiber, nut  
9 shells, and paper.

1       10. The additive of claim 9 wherein the reinforcing  
2       material comprises comminuted mixture of rice fraction,  
3       corn cob pith and chaff, cedar fiber, nut shells, and  
4       paper.

1       11. A method of forming a lost circulation fluid  
2       comprising:

3             (a) providing a lost circulation additive  
4       comprising a dry mixture of water soluble crosslinkable  
5       polymer, a crosslinking agent, and a reinforcing material  
6       selected from among fibers and comminuted plant  
7       materials; and

8             (b) contacting the lost circulation additive with  
9       water or an aqueous solution to form the lost circulation  
10      fluid.

1       12. The method of claim 11 wherein the polymer is a  
2       partially hydrolyzed polyacrylamide, the crosslinking  
3       agent is a chromic carboxylate complex, wherein the  
4       additive further includes cellophane, and wherein the

5 reinforcing material is a comminuted material selected  
6 from among mixtures of comminuted rice fraction and  
7 peanut hulls; mixtures of comminuted rice fraction, and  
8 wood fiber or almond hulls; mixtures of comminuted rice  
9 fraction and corn cob fraction; and mixtures of  
10 comminuted rice fraction and corn cob fraction and at  
11 least one of wood fiber, nut shells, and paper.

1 13. The additive of claim 12 wherein the reinforcing  
2 material comprises comminuted mixture of rice fraction,  
3 corn cob pith and chaff, cedar fiber, nut shells, and  
4 paper.

1 14. A method for preventing lost circulation from a  
2 borehole into a subterranean formation comprising:  
3 (a) providing a lost circulation additive  
4 comprising a dry mixture of water soluble crosslinkable  
5 polymer, a crosslinking agent, and a reinforcing material  
6 selected from among fibers and comminuted plant  
7 materials;

8                 (b) contacting the lost circulation additive with  
9 water or an aqueous solution to form a lost circulation  
10 fluid; and

11                 (c) injecting the lost circulation fluid into the  
12 borehole.

1         15. The method of claim 14 wherein the polymer is an a  
2 carboxylate-containing polymer and the crosslinking agent  
3 is a chromic carboxylate complex

1         16. The method of claim 15 wherein the reinforcing  
2 material comprises hydrophilic and hydrophobic fibers.

1         17. The method of claim 16 wherein the hydrophobic  
2 fibers comprise at least one selected from the group of  
3 hydrophobic fibers consisting essentially of nylon,  
4 rayon, and hydrocarbon fibers, and wherein the  
5 hydrophilic fibers comprise at least one selected from  
6 the group of hydrophilic fibers consisting essentially of  
7 glass, cellulose, carbon, silicon, graphite, calcined  
8 petroleum coke, and cotton fibers.

1       18. The method of claim 15 wherein the reinforcing  
2       material comprises comminuted plant material.

1       19. The method of claim 18 wherein the reinforcing  
2       material comprises at least one comminuted material  
3       selected from the group of comminuted plant materials  
4       consisting essentially of nut and seed shells or hulls of  
5       almond, brazil, cocoa bean, coconut, cotton, flax, grass,  
6       linseed, maize, millet, oat, peach, peanut, rice, rye,  
7       soybean, sunflower, walnut, and wheat; rice tips; rice  
8       straw; rice bran; crude pectate pulp; peat moss fibers;  
9       flax; cotton; cotton linters; wool; sugar cane; paper;  
10      bagasse; bamboo; corn stalks; sawdust; wood; bark; straw;  
11      cork; dehydrated vegetable matter; whole ground corn  
12      cobs; corn cob light density pith core; corn cob ground  
13      woody ring portion; corn cob chaff portion; cotton seed  
14      stems; flax stems; wheat stems; sunflower seed stems;  
15      soybean stems; maize stems; rye grass stems; millet  
16      stems; and mixtures thereof.

1       20. The method of claim 15 wherein the polymer is a  
2       partially hydrolyzed polyacrylamide.

1       21. The method of claim 20 wherein the reinforcing  
2       material is a comminuted material selected from among  
3       comminuted materials derived from peanuts, wood, paper  
4       any portion of rice seed or plant, any portion of corn  
5       cobs, and mixtures thereof.

1       22. The method of claim 21 wherein the additive further  
2       includes cellophane, and wherein the reinforcing material  
3       is a comminuted material selected from among mixtures of  
4       comminuted rice fraction and peanut hulls; mixtures of  
5       comminuted rice fraction, and wood fiber or almond hulls;  
6       mixtures of comminuted rice fraction and corn cob  
7       fraction; and mixtures of comminuted rice fraction and  
8       corn cob fraction and at least one of wood fiber, nut  
9       shells, and paper.

1       23. The method of claim 22 wherein the reinforcing  
2       material comprises comminuted mixture of rice fraction,

3 corn cob pith and chaff, cedar fiber, nut shells, and  
4 paper.

5 ~~24.~~ A method for decreasing fluid loss from a borehole  
6 into a subterranean formation comprising:

7 (a) providing a lost circulation additive  
8 comprising an aqueous solution of water soluble  
9 crosslinkable polymer, a crosslinking agent, and a  
10 reinforcing material selected from among fibers and  
11 comminuted plant materials; and

12 (b) injecting the lost circulation fluid into the  
13 borehole.

1 25. The method of claim 24 wherein the polymer is an a  
2 carboxylate-containing polymer and the crosslinking agent  
3 is a chromic carboxylate complex.

1 26. The method of claim 25 wherein the reinforcing  
2 material comprises hydrophilic and hydrophobic fibers.

1       27. The method of claim 26 wherein the hydrophobic  
2       fibers comprise at least one selected from the group of  
3       hydrophobic fibers consisting essentially of nylon,  
4       rayon, and hydrocarbon fibers, and wherein the  
5       hydrophilic fibers comprise at least one selected from  
6       the group of hydrophilic fibers consisting essentially of  
7       glass, cellulose, carbon, silicon, graphite, calcined  
8       petroleum coke, and cotton fibers.

1       28. The method of claim 25 wherein the reinforcing  
2       material comprises comminuted plant material.

1       29. The method of claim 28 wherein the reinforcing  
2       material comprises at least one comminuted material  
3       selected from the group of comminuted plant materials  
4       consisting essentially of nut and seed shells or hulls of  
5       almond, brazil, cocoa bean, coconut, cotton, flax, grass,  
6       linseed, maize, millet, oat, peach, peanut, rice, rye,  
7       soybean, sunflower, walnut, and wheat; rice tips; rice  
8       straw; rice bran; crude pectate pulp; peat moss fibers;  
9       flax; cotton; cotton linters; wool; sugar cane; paper;

10 bagasse; bamboo; corn stalks; sawdust; wood; bark; straw;  
11 cork; dehydrated vegetable matter; whole ground corn  
12 cobs; corn cob light density pith core; corn cob ground  
13 woody ring portion; corn cob chaff portion; cotton seed  
14 stems; flax stems; wheat stems; sunflower seed stems;  
15 soybean stems; maize stems; rye grass stems; millet  
16 stems; and mixtures thereof.

1 30. The method of claim 25 wherein the polymer is a  
2 partially hydrolyzed polyacrylamide.

1 31. The method of claim 30 wherein the reinforcing  
2 material is a comminuted material selected from among  
3 comminuted materials derived from peanuts, wood, paper  
4 any portion of rice seed or plant, any portion of corn  
5 cobs, and mixtures thereof.

1 32. The method of claim 31 wherein the additive further  
2 includes cellophane, and wherein the reinforcing material  
3 is a comminuted material selected from among mixtures of  
4 comminuted rice fraction and peanut hulls; mixtures of

5 comminuted rice fraction, and wood fiber or almond hulls;  
6 mixtures of comminuted rice fraction and corn cob  
7 fraction; and mixtures of comminuted rice fraction and  
8 corn cob fraction and at least one of wood fiber, nut  
9 shells, and paper.

1 33. The method of claim 32 wherein the reinforcing  
2 material comprises comminuted mixture of rice fraction,  
3 corn cob pith and chaff, cedar fiber, nut shells, and  
4 paper.